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ABSTRACT

A battery of tests requiring sequential responses, including WISC Digit Span, WISC Picture Arrangement, ITPA Digits, and ITPA Visual Motor Sequencing, was administered to 114 children. Fifty-seven children ranging in age from 6.6 to 13.7 years were clients referred to a reading clinic for diagnosis of reading difficulties; the other 57 were randomly selected normal readers of matched ages. The comparison of results showed that the normal readers scored significantly higher than the clinic readers on all tests. When the Detroit Tests of Memory for Related Syllables and Visual Memory of Letters were administered to 29 children of each group, the normal readers also significantly outperformed the clinic readers. The author suggested that observations by teachers in the class may be directed to pupil responses in reading and spelling tasks and when pupils show difficulty with sequence, more practice should be planned. Tables and references are included. (AW)

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Sequential Memory Responses of Normal and Clinic Readers

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by

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Sequential Memory Responses of

Normal and Clinic Readers

Reading and spelling of English require encoding or responding in a left to right sequence. Many children can not respond with the correct sequence of symbols in oral reading or in written spelling. It is not immediately known whether the difficulty is with the acceptance and integration of stimuli or with the response mode. (Hainsworth) For example, a child may not read a word orally as expected, but he may point to the word to show that he "reads" it.

The child who cannot write words from dictation may have auditory sequential memory for the sequence of sounds in the word. If he lacks the visual sequential memory for the individual letters, he cannot write the word correctly. Disorders in auditory memory span interfer with both reading and spelling.

The difficulty with sequential responses on short term memory tasks is often observed in reading clinics. Some of the same children cannot relate events in sequence, follow commands in sequence, or arrange picture stories in sequence.

Unpublished research by Elmer and Wakefield identified first grade children by output mode and trained attention to sequential responses. In work with poor readers, others have used spatial and temporal orientation tasks to stimulate perceptual dificits. (Hagin) Beery's research also found

that average and subaverage reader groups can be differentiated by sequential tasks of matching visual to auditory symbols.

Difficulty with visual motor sequencing tasks was highly significant in Graubard's studies of delinquents who were poor readers. The same studies showed significant differences to normal readers in use of sequence of verb tense.

On a battery of tests requiring sequential responses, do normal children of the same age score significantly different than clinic children? A study was conducted by Wakefield and Elmer to examine differences in performance between these groups.

The population of this study was one hundred fourteen children. Fifty seven of the children ranging in age from 6-6 to 13-7 were clients referred to a University reading clinic for diagnosis of reading difficulties. These will be referred to as clinic readers. They were compared to a group of 57 children randomly selected of matched ages who were progressing satisfactorily in school and considered to be normal readers. All were considered to be average or above in intelligence since none had been referred to special education classes available in their schools. No child with impaired vision or hearing was included.

The children were administered a battery of tests requiring scores on sequence responses, WISC Digit Span, WISC Picture Arrangement, ITPA Digits and ITPA Visual Motor Sequencing. Twenty nine in each group were administered the Detroit Tests of Memory for Related Syllables and Visual Memory for Letters.

Results:

Data by analysis of variance is reported in Table 1.

Table I

Scores on Sequential Tasks -
Normal and Clinic Readers

Test	Source of Variation	ss	df	M.S.	F
WISC Digit Span	Between	273.79	1	273.792	32.87*
	Within	933.09	112	8.33	
WISC Pic. Arr.	Between	292.61	1	292.609	33.06*
	Within	991.44	112	8.85	
ITPA Digit Span	Between	28.46	1	28.461	17.57*
	Within	145.77	90	1.62	
ITPA Visual Motor Seq.	Between	40.22	1	40.221	14.50*
	Within	249.64	90	2.77	
Detroit Rel. Syllables	Between	41.82	1	41.280	7.98*
	Within	293.60	56	5.24	
Detroit Vis. Memory	Between	144.07	1	144.065	44.07*
	Within	183.08	56	3.27	

*significant at .01 level

1. On the Digit Span sub test of the WISC, the normal readers scored significantly higher than the clinic readers.
2. On the WISC Picture Arrargement, the normal readers scored significantly higher than the clinic readers.
3. The ITPA Digit Span Test was performed at a significantly higher score by the normal readers than the clinic readers.

4. The normal readers scored significantly higher on tasks of visual sequential memory motor response on ITPA test.
5. Fifty eight of the subjects were administered the Detroit Test of Learning Aptitude for Related Syllables. The normal readers scored significantly higher on this test also.
6. The Detroit test for visual memory for letters showed significant difference in favor of the normal reader also.

A survey of the sub tests according to the imput mode and output mode is presented in Table 2. Each task, regardless of imput mode or output mode, differentiated normal and clinic readers.

Test II

Test	Imput	Output
WISC Digit Span	Aural	Vocal*
Detroit Syllables	Aural	Vocal*
ITPA Digit	Aural	Vocal*
ITPA Visual Sequence	Visual	Motor*
WISC Picture Arrangement	Visual	Motor*
Detroit Letters	Visual	Vocal*

*significant at .01 level

Implications:

Observation by teachers may be directed to response pupils make in reading and spelling tasks. When a child's errors show difficulty with sequence, educational activities could be planned to provide response practice.

Responses only were studied. Further studies would be necessary on lack of sensory integration. However, classroom activities in reading and spelling could be started to provide experiences for association, both visual and auditory. The tasks could be devised in order of difficulty to begin attention and response to two items, later three items, then four items.

A child's use of language and his ability to relate or arrange events in sequence should be studied. This may have broad implications for language development preceeding formal instruction in spelling and reading.

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